ORIGINAL ARTICLES

Chelation Therapy with Desferrioxamine does not Normalize Ferritin Level but Attenuates Oxidative Damage and Improves Total Antioxidant Level in Malaysian Chinese β-thalassaemia Major Patients

UR Kuppusamy, JAMA Tan

ABSTRACT

Beta-thalassaemia major causes severe anaemia and patients with it may be transfusion-dependent for life. Regular blood transfusions cause iron-overload that leads to oxidative damage which can hasten mortality. The objective of this research was to study the oxidant-antioxidant indices in β-thalassaemia major patients at the University of Malaya Medical Centre (UMMC) who were on desferrioxamine-chelation or without chelation therapy. Blood was collected from 39 Chinese patients and 20 controls. Plasma and peripheral blood mononuclear cell lysates (PBMC) were extracted and biochemical tests to evaluate oxidative stress were performed. Oxidative stress was evident in these patients as advanced oxidized protein products (AOPP) and lipid hydroperoxides were elevated, whereas glutathione peroxidase activity and the ferric reducing antioxidant power (FRAP) were reduced. The catalase activity in the patients' PBMC was elevated, possibly as a compensatory mechanism for the reduced glutathione peroxidase activity in both red blood cells and PBMC. The lower FRAP and higher AOPP levels in the non-chelated patients compared with the chelated patients were indicative of a lower oxidative stress level in the chelated patients. The ferritin levels in the chelated and non-chelated patients were high and the mean levels of liver enzyme activities in the majority of patients were elevated regardless of chelation therapy. In conclusion, this study indicates that desferrioxamine chelation therapy does not normalize ferritin level but attenuates oxidative damage and improves total antioxidant level in Malaysian Chinese β-thalassaemia major patients.

Keywords: Beta-thalassaemia major, desferrioxamine, Malaysian Chinese, non-chelated, oxidative stress

La Terapia de Quelación con Deferoxamina no Normaliza los Niveles de Ferritinaa pero Atenúa el daño Oxidativo y Mejora el Nivel Antioxidante Total en los Pacientes Sinomalayos que Padecen de Talasemia ß

UR Kuppusamy, JAMA Tan

RESUMEN

La beta-talasemia mayor causa anemia severa, y los pacientes con este padecimiento pueden hacerse dependientes de las transfusiones de sangre por el resto de sus vidas. Las transfusiones regulares de sangre dan lugar a una sobrecarga de hierro que conduce al daño oxidativo, el cual a su vez puede acelerar la mortalidad. El objetivo de esta investigación fue estudiar las tasas de oxidantes-antioxidantes en pacientes de beta-talasemia mayor en el Centro Médico de la Universidad de Malaya, tanto aquellos bajo tratamiento de quelación con deferoxamina, como aquellos sin terapia de quelación alguna. Se recogieron muestras de sangre de 39 pacientes chinos y 20 controles. Se extrajeron plasma

From: Department of Molecular Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia.

Correspondence: Professor JAMA Tan, Department of Molecular Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia. E-mail: maryanne@um.edu.my